

## THE SOUTHERN LIMITS OF *TRIENTALIS BOREALIS*

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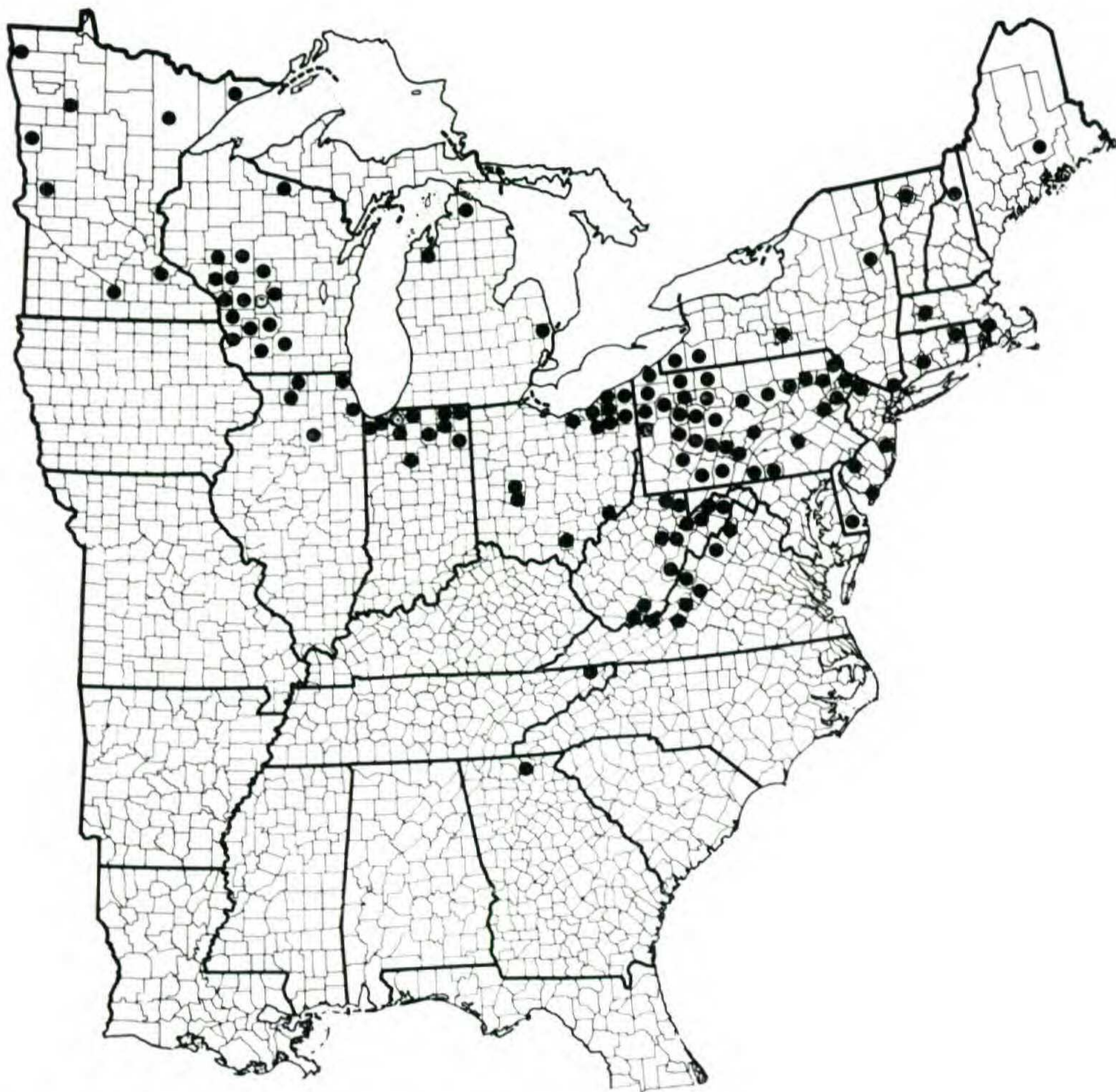
*Trientalis borealis* Raf. is now known to be another of those species having northern affinities but extending southward in the mountains of the eastern United States into Georgia. On the basis of known stations this species is in one sense doubly disjunct. There are a number of localities where the species is known to occur in the mountains as far south as southern West Virginia and adjacent Virginia, in the Kanawha Plateau, Allegheny Mountains, and Ridge and Valley Province. Southward there are only two widely separated localities known for the species. The next station south of those in Virginia and West Virginia was reported by James (1955) from northeastern Tennessee in the hills of Sullivan County near Bristol. This locality is about 90 miles from the nearest known population to the north, that in Mercer County, West Virginia. Sharp and Baker (1964) state that in Tennessee *T. borealis* "has been collected only in Sullivan County."

On 12 May 1963 I collected *Trientalis borealis* at about 3,700 feet elevation in a north-facing ravine in the southern part of Union County, Georgia. This locality is about 160 miles from the nearest known station, in Tennessee. It is on the basis of the 90 mile and 160 mile intervals that I suggest the species might be described as doubly disjunct in the southeastern mountains.

That the station in Georgia represents a significant extension in range was established by analyzing distributional data from the University of Georgia and other herbaria.<sup>1</sup> These data are recorded on Map 1. The westernmost records shown in Minnesota and the southernmost records in the states from Illinois to Georgia and Delaware are at or near the known western and southern limits of the species in the United States. However, since I sought primarily to

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<sup>1</sup>The records generously provided by curators from the several herbaria are gratefully acknowledged.



Map 1. Southern distribution of *Trientalis borealis*.

establish the southern limits of *T. borealis*, the records shown northward on Map 1 do not reflect its abundance there. Distributional data given by Anderson (1968) show that the species is more abundant northward, although failing to show the southernmost records for Illinois and Ohio and the single record previously reported for northeastern Tennessee. The species has also been reported in Canada west to Alberta and northeast to Labrador (Gleason and Cronquist, 1963; Anderson, 1968).

Much botanizing has been done in the Smoky Mountains and other parts of the southern mountains without *Trientalis* being found, therefore making the "outpost" in Georgia of considerable interest. The factors which provide a suit-

able habitat at the Georgia station, and which are apparently not present at intervening habitats, are not known. The ravine, however, is obviously cool in nature and is occupied mostly by species which are distinctly northern in distribution.

The ravine drops from about 4,000 to 3,150 feet elevation in 0.35 mile between two ridges which run downwardly N 26° W and N 30° E respectively from a point where they diverge from a single higher ridge. Little sun reaches the forest floor in the heart of the ravine. Early and late in the day the two ridges block out the sun. In the middle part of the day the sun is too low on the horizon to shine on the floor except in summer and then the rays are at such a steep angle with the floor of the ravine that the canopy of the woody vegetation provides a considerable barrier to them.

Much of the ravine is occupied by small to very large angular boulders in a jumbled arrangement. Some of the thousands of plants of *Trientalis* growing in the ravine occur on top of boulders; others occur between the boulders and on parts of the steep slopes of the eastern side of the ravine. When plants from different localities in the ravine were dug up it was discovered that all were rooted in weakly consolidated, partially decayed light brown humus composed largely of leaves from deciduous woody plants. The roots seemed to have little association with the mineral soil. Anderson (1968) reports that the rhizome grows just under the organic layer to within a centimeter of the surface in Wisconsin.

Vegetation in the ravine is quite northern in aspect, most of the species occurring there being typically northern in their distribution. For example, *Dryopteris goldiana* (Hook.) A. Gray was reported from there as the southernmost record for the species (Duncan, 1948). The character of the vegetation in the ravine is indicated by the following list of some other species occurring there.

WOODY PLANTS: *Juglans cinerea*, *Betula lenta*, *B. lutea*, *Magnolia acuminata*, *M. fraseri*, *Rubus odoratus*,

*Cladrastis lutea*, *Ilex montana*, *Euonymus obovatus*, *Acer pennsylvanicum*, *A. spicatum*, and *Aesculus octandra*. HERBACEOUS PLANTS: *Trillium erectum*, *T. grandiflorum*, *T. vaseyi*, *Asarum canadense*, *Aquilegia canadensis*, *Diphyleia cymosa*, *Dicentra canadensis*, *D. cucullaria*, *Impatiens pallida*, *Aralia nudicaulis*, *Hydrophyllum canadense*, and *Monarda didyma*.

I overlooked *Trientalis* on previous visits to the ravine, and others may have overlooked the species elsewhere in the southeastern United States. Mature plants of *Trientalis* with their single whorls of leaves resemble *Medeola virginiana* and some species of *Lysimachia*. A second and careful look at plants of that appearance may reward the observer with the discovery of a third station for *Trientalis borealis* in the southeastern United States.

A voucher specimen of *Trientalis borealis* from Georgia is on deposit in the University of Georgia Herbarium (Duncan 22050).

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#### LITERATURE CITED

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